THE AMERICAN JOURNAL
OF
OPHTHALMOLOGY

VOL. XXVIII. APRIL, 1911. No. 4.

ORIGINAL ARTICLES.

VERY EXTENSIVE DIRECT RUPTURE OF THE CHOROID AND RETINA FROM A GUN SHOT.*

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Von Wecker in the first edition of Graefe-Saemisch says:

"Tears of the choroid were, strangely enough, in the beginning of ophthalmoscopic studies considered as *curiosa* which but seldom come under observation; so that shortly before the war of 1870, Knapp considered it of sufficient importance to publish a table of the then reported cases; to which however he added eight new cases of his own with the comment that these cases were by no means as rare as had been believed.

"All who had an opportunity, during the war, to examine ophthalmoscopically many wounded with gun shot wounds of the orbits, could convince themselves that ruptures of the choroid are very often produced by severe *commotio*, or concussion of the eye.

"I go further, and assert that one can seldom examine an eye which has been severely contused in which one cannot discover a more or less extensive choroidal rupture."

Von Graefe, in 1854, was the first to call attention to, and emphasize, the fact that the choroid can be torn, without external injury to the eye, by a severe contusion.

Since then a considerable number of observations have been published, which were collected by Caillet, Knapp, and Von

*Read at the meeting of the St. Louis Ophthalmological Society, March 13th, 1911.

Wecker. Now the number of these cases has grown so that it would not be worth while to report one's own cases.

Nevertheless, up to the present there have been reported only two single cases (von Ammon in 1855 macroscopically, and A. Alt in 1897 microscopically) in which there was opportunity to confirm the diagnosis of a choroidal rupture by anatomical examination.

It is difficult to decide in the majority of cases to what extent the retina, in its entire thickness, is torn. In all cases of rupture of the choroid a simultaneous separation of the pigmented epithelium layer of the retina takes place, and it may be accepted as a certainty that this sudden separation cannot take place without a lesion of the other layers of the retina as well; especially, when one considers that the pigmented retinal epithelium embeds itself with toothed processes into the layer of rods and cones.

That the tear can, in some cases, go much deeper into the retina, is proven by observations in which the torn retinal vessels could be seen over the choroidal tear, or even a hæmorrhage into the vitreous, from the partially separated retina, had taken place. In the majority of cases, however, there is only a simple tear of the choroid with a separation of the outermost layers of the retina.

In the ophthalmoscopic picture the choroidal rupture appears quite different, depending upon whether one sees it shortly after its occurrence, or at a time when the tear has changed more or less into a scar.

A few hours after the injury the choroidal wound forms a slightly yellowish-redish streak, whose border is rounded off, and the majority of cases set in by a thin sheet of light red blood, which escaped into the choroid.

It is by no means always easy, when the media and the retina are not clear, in eyes that are usually much irritated and tearing, to accurately discover the details.

After the frequent hæmorrhages in the vitreous and in the anterior chamber have been absorbed, then the choroidal rupture appears as a yellowish or even whitish-yellow streak situated between the macula and papilla, concentric with the latter.

The greatest breadth of the tear usually does not exceed one-third to one-half of the diameter of the papilla, and one seldom sees tears that exceed the diameter three or four times.

The tear may show sharp projections that come off at right

angles, which may extend to and connect with other tears. Often the rupture ends with a forked projection or branch.

One cannot compare the tears of the choroid, in the variety of their form, better than to the cracks which form in varnish which spread on a spherical surface dried too quickly. The site at which the tears generally occur is the region between the macula and the papilla, being the outer and upper segment of the fundus.

The more the choroidal tear becomes scarred, the more it contracts from the sides and takes on a whitish, never bluish-white, color; as the scleral tissue never appears distinctly in these tears.

Simultaneously the hæmorrhages in the adjacent choroidal tissue disappear and the edges of the tear become bordered more or less completely with pigment. The region of the tear may also become somewhat pigmented.

Not seldom one discovers at some distance from the scar old hæmorrhagic spots (especially near the macula) and patches of traumatic choroiditis.

Later anatomical examinations will explain why the choroidal tears never take the glistening color of some scleral staphylomata; and it is probable that the choroid does not tear in its entire thickness, but that the elastic lamina fusca remains attached to the sclera at the site of the wound.

Quite different in appearance, from these indirect ruptures of the choroid, are the tears produced by direct injury, be it by cutting instruments, be it by the penetration of fragments of priming caps, or by the penetration of small shot. In these cases we always have to deal with very irregular ragged scars,—bordered by profuse pigmentation and in which the sclera shows completely bare with its bluish-white glistening lustre.

With the exception of a few cases all ruptures of the choroid have been in the vicinity of the posterior pole and the entrance of the optic nerve.

Saemisch describes a case in which the tears in the choroid and retina were exclusively near the ciliary region. Excluding this, the tears almost without exception have a curved form and are more or less concentric with the papilla. Without doubt this peculiar position and conformation of the tear is dependent upon the mechanical causes which produce choroidal rupture.

Saemisch thinks that the passage of the numerous posterior ciliary arteries around the pole holds the choroid more fixed here and hinders its displacement, in comparison to the other more movable parts of the uveal tract and retina.

When a severe trauma produces a considerable displacement of the choroid, it tears preferably in this fixed portion while the other portions accommodate themselves more readily to the distortion and displacement.

Undoubtedly this fixation of the choroid by the vessels, as well as its attachment and letting in at the papilla, has an important influence; it must hold good for the anterior portion of the uveal tract, and in consequence of its lack of movability, ruptures also take place here. The separation of the iris from its attachment by the blows of foreign bodies against the eye gives evidence of this.

Unfortunately the anterior portions of the uveal tract, which applies to the choroid, are not open to inspection; but we can convince ourselves, by the presence of hæmorrhages in the vitreous and a circumscribed detachment of the retina, that the tears in the anterior attachment of the choroid must take place in a quite similar manner, as was described for the posterior portion.

Knapp also assumes, that the points of fixation of the choroid exert an important influence on the localization of the tears; he thinks, however, that they come about in a manner similar to certain fractures of the skull, i.e., through contrecoup.

Arlt thinks, that by the pressing of the globe against the adipose cushion, the eye becomes flattened, that thus the globe becomes distended to its maximum in its æquatorial diameter, and when the extensibility of the choroid has been exceeded, tears come which must necessarily be transverse to the direction of the stretching; therefore concentric to the posterior pole. In this the attachments of the choroid must naturally be considered.

Even though it will be almost impossible to analyze in every case the mechanism through which a choroidal rupture has taken place, still there can be no doubt that a uniformity of action in the various kinds of injury manifests itself and it is probable that the wavelike commotion and pulling in a very resistant globe, as well as the simultaneous compression with subsequent stretching of the choroid, can cause it to tear.

Up to the present neither the experiments of Hillenkamp on dogs, nor those of Caillet on rabbits, have established the mechanism of choroidal rupture; whereas it is easy to succeed in fractures of the skull, to which one is so much inclined to compare ruptures of the choroid.

Berlin* in an article on "Wounds of the Orbit" states: "This rupture of the choroid, of which I myself saw four, once on both

*Berlin, Graefe Saemisch, Vol. 6, p. 592, 1st Ed.

sides, in gun shot wounds, whenever it is associated with fractures of the orbit, is always found in that part of the globe which was touched by the projectile."

Indirect ruptures brought on by contrecoup (Gegendruck) occur only rarely in gun shot wounds, and then only when an exhausted projectile, generally it has been a small shot, struck a portion of the globe which was unprotected by the orbital walls.

HERE FOLLOWS THE DESCRIPTION GIVEN BY VON AMMON* OF THE MACROSCOPICAL APPEARANCE OF CHOROIDAL RUPTURES EXAMINED UNDER WATER.

"Above the macula lutea and the foramen longum obliquely outward there was easily recognized a kneelike, not very much raised, elevation of the retina. As the retina was separated from the choroid by the interposition of the water one could see the vessels on the posterior part of the retina more filled with blood than the other ones. Besides there appeared close behind the raised portion of the retina mentioned a wedge shaped tear in the choroid, the size of several lines. The edges of the burst choroid did not gape; within them there was no extravasated blood. The inner surface of the choroid was free from blood, the vessels were empty and therefore were of a white color. Between the posterior surface of the choroid and the sclera there was extravasated blood, but not in the form of a thick layer but as a thin layer in the form of vessels. These thin ramifications of blood extravasation agglutinated the sclera and the posterior surface of the choroid in several places. . . . . Remarkable was the tear in the choroid of the right eye. No wound could be seen in the sclera and the retina in that place. Only the choroid lying between the two mentioned membranes was ruptured.

How this choroidal rupture could take place, it is not easy to say. Possibly the turning in of the sclera on itself brought on by the concussion of the globe (for in this manner the concussions manifest themselves on yielding organs) tore the contiguous choroid. This also explains why the retina remained intact, as it could not be struck by the sclera, bent upon itself.

Choroidal rupture, without injury to the retina, following severe injuries to the eye, has been diagnosed by means of the Ophthalmoscope by A. v. Graefe (*Archiv. fuer Ophthal.*, Bd. 1, S. 402).

*Von Ammon in Archiv. fuer Ophthalmologie, Bd. 1, 2, p. 124, also p. 127.

The foregoing anatomical observation verifies its occurrence. The ophthalmoscopic appearance in this case cited resembled those described by von Graefe."

THE FOLLOWING IS THE DESCRIPTION OF THE MICROSCOPICAL CONDITIONS IN RUPTURES OF THE CHOROID GIVEN BY A. ALT.*

"The simplest form of rupture of the choroid which I found produced by the injury, was a tear through the lamina vitrea and pigment epithelium. This was followed, or perhaps preceded, by a hæmorrhage which lifts up a small fold of retina. The blood is mixed with a large number of cells containing pigment and free pigment granules, evidently derived from the cells of the pigment epithelium in the neighborhood of the rupture. The retina, excepting its bacillary layer, is comparatively unaltered.

The larger the tear, and the more the blood extravasated under the retina, the greater is the alteration by the pressure in the structure of the retina, until, in some places, this can hardly be recognized as such. In spite of such considerable alterations in structure the retinal bloodvessels may remain apparently unaltered; at least they are so in a number of places in this case. They are, in some of these, very hyperæmic, especially the veins, in others they are empty; and sometimes they show signs of a beginning endovasculitis.

In some parts two or three such small ruptures of the inner surface of the choroid are situated close beside each other. Near one there seem to be evidences of a new formation of bloodvessels, which grow from the choroid into the extravasated blood, by which the retina is pressed inward toward the vitreous.

In one place a rupture has taken place through the whole thickness of the choroid. The gap resulting in this manner is filled and covered over with retinal tissue. At the edge of this tear the retraction of the choroidal wound lips is plainly shown by the wavy line formed by the relaxed lamina vitrea. The pigment epithelium seems to be proliferating, and new unpigmented cells are situated in the folds of the lamina vitrea. The retinal tissue covering the gap has lost all its characteristic features. It appears as a loose, more or less laminated connective tissue, in which are embedded a number of round cells, perhaps remnants of the retinal cells, and cells carrying pigment derived from the choroidal cells or from those of the pigment epithelium layer.

*Ophthalmic Review, Vol. XVI, October, 1897.

This, I think, is the histological appearance of that condition which has clinically been termed an isolated rupture of the choroid."

The exceptional features of my case of direct choroidal rupture are: the very large amount of choroid which was torn, the displacement of the retinal vessels and the unusual course of the bullet which produced the rupture.

Miss X., aged 21, iris blue, hair light red, was shot with a No. 32 revolver at short range three times in the chest and once in the right temple. Of the shots that entered the chest, one passed through the lung, the others did no harm.

The shot in the temple entered a little posterior to and below the termination of the right eyebrow; it passed through the right globe plowing through the right cornea; passed through the upper portion of the nasal cavity and entered the left orbit with sufficient force to produce a direct rupture of the choroid of the left eye. This occurred on January 25, and the patient was seen by the writer three days later.

There is a very large tear in the right cornea, which is hazy and powder burned; the temporal side of the right orbit is much lacerated; the conjunctiva is torn and swollen; the eyelids are uninjured. The left eye appears normal.

O.D. V=Nil; O.S. V=2/75.

The patient kept the eyes closed and it was necessary to raise the eyelid to test the vision.

As the patient was in a very critical condition because of the wound in the lung, breathing laboredly, and semi-comatose, no further examination of the left eye was made as it appeared quite normal and apparently uninjured.

The assumption was that the bullet had left the head through the right eye.

The patient remained under the care of a general practitioner and was not seen again until March 22, and the following notes were made:

O.D. is now a shrunken globe. O.S. V=fingers at 2 feet. The pupil is moderately dilated and reacts imperfectly to light; no other external evidence of any trouble.

The ophthalmoscope gives: Large hæmorrhages in the fundus, possibly subhyaloid; some floating membranes in the vitreous, probably detached retina. The vitreous seemed fairly clear; nevertheless no retinal vessels could be seen. The disc was covered by what appeared like a large clot of blood. The hæmorrhagic portion was best seen with +8 D. spherical.

May 14, O.S. V=3/192 to 3/150 not improved by lenses. No vision in the upper part of the field. Ophthalmoscope gives: Lower half of fundus white with a few small blood vessels visible. Upper half of fundus normal in color but the retinal bloodvessels extend in a horizontal direction from the disc on the temporal as well as on the nasal side, and disappear abruptly in the periphery. They are somewhat distended. The outline of the disc cannot be distinguished; it appears to be swollen; there are hæmorrhagic patches along the line which separates the lower from the upper half (normal and white parts) of the fundus and also scattered over the retina.

A well-marked horizontal zone of pigmentation is now seen between the upper and the lower parts of the fundus.

The pupil is moderately dilated, and reacts imperfectly to light. Patient is said not to have any sense of smell.

June 16, the hæmorrhages have cleared up except one small one.

July 14, the outline of the disc is now better defined. V=3/150 to 3/96.

August 24, the patient thinks that vision has improved, and this statement was verified by the visual result, which was 3/96 to 3/75.

Nov. 11, O.S. V=3/96. The disc is not yet well defined, but the outline is plainly visible. The hæmorrhages have all disappeared. From the disc downwards and outwards to the vessels extend two narrow white bands, which may be only scar tissue, or obliterated blood vessels. The horizontal zone of pigmentation is very heavy. There is an arc of pigmentation in the upper nasal part of the retina. The bloodvessels have assumed a more normal size except that the arteries may be a little small.

March 2, 1911. A little more than a year has now elapsed since the date of the injury. V=3/75. No vision in the upper part of the field. The ophthalmoscopic appearance is very much as it was in November, except that the heavy zone of pigmentation then noted has become much lighter. There are no bloodvessels visible in the lower part of the fundus which is greyish white. The upper portion of the fundus is normal in color, but the bloodvessels on the temporal side extend in a somewhat horizontal direction, following the line of demarcation about 3 disc diameters and then going upward. On the nasal side a small artery emerges internally to the disc, goes downward to the lower border of the normal retina where it gives off a branch which extends horizontally nasalward and is lost in the pigmented

border. The main artery turns upward and inward to the nasal side of the retina.

The vein on the nasal side follows a similar course. There are only two main arteries and two veins visible."

In looking at a skull we see that the bullet passed through the bones as follows: entering at the junction of the orbital plate of the malar bone with the greater wing of the sphenoid, and the orbital plate of the frontal, it passed through the orbit; having crossed the orbit, it probably passed through the ethmoid bones and entered the left orbit and passed to the temporal side of and below the left globe as located by the Roentgenologist.

At this date the eye was kindly examined and the appearance as stated verified by Drs. W. A. and J. F. Shoemaker, Drs. N. M. Semple and W. F. Hardy.

For an X-ray photograph and a localization of the bullet below and to the temporal side of the globe, I wish to thank Dr. Carman.

For the generous and kind use of literature, I wish to thank Drs. John Green, Adolf Alt, A. E. Ewing, and Wm. E. Shahan.

GLIOMA OF THE RETINA.

Report of One Case of Unilateral and One Case of Bilateral Glioma.*

By S. C. Ayres, M.D.,
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It is not the object of this paper to discuss the pathology of this very fatal and much-dreaded disease of childhood, but rather to add to the statistics of the cases already reported. It is remarkable that we are able to present this evening two cases of glioma affecting both eyes and one involving one eye. The proportion of cases of double to single glioma is fairly well established.

The statistics of Lawford and Collins, Marshall, Wintersteiner and Hirschberg, collected by Mr. Owen in Vol. xvi. of the Royal London Ophthalmic Hospital Reports, show that they record 135 cases of bilateral glioma and 417 cases of unilateral, making a total of 552 cases. This shows that the proportion of bilateral to unilateral is a fraction less than 25 per cent. Quite in contrast with this is the number observed by Vetch, in the report referred to above, which shows only one bilateral to twenty-two unilateral.

I am indebted to Dr. Lockhard Nelson, of Hillsboro, O., for the following case :

Case I—*Unilateral Glioma of the Retina.*—Girl four years of age. Was first examined by him March 2, 1908. The father stated that the left eye had looked "queer" for a year. For two months previously she had had severe pain in it. She was emaciated, and suffered from sick stomach and vomited frequently. The pupil of the left eye was moderately dilated and fixed. Tension+. A yellowish reflex from the eye was visible without illumination. A diagnosis of glioma retinæ was made and the eye enucleated the next day. Patient made a prompt recovery, pain was relieved, appetite returned, and in a few days she was playing around the house as usual. The eye was opened and a tumor found which extended from the optic nerve almost to the lens. When the incision was made into the sclera, a dark-brownish fluid ran out. The tumor was soft, whitish in color, and almost filled the globe. No microscopic examination of it was made. The optic nerve was found enlarged. Three months after the enucleation a tumor began to develop from the apex

*Read before the Academy of Medicine of Cincinnati, January 9, 1911.

of the orbit. It grew with great rapidity and soon filled the orbit. At this time Dr. Nelson sent the case to me for consultation. When I saw her, June 9, I found the orbit filled with a reddish smooth tumor, which filled the orbit so completely that the upper lid was put upon the stretch. Patient was not suffering pain, but somewhat emaciated. As it was undoubtedly a recurrence of the glioma from the optic nerve, no operation was recommended. She died four months after the enucleation. The ophthalmoscopic appearance of the growth, its macroscopic appearance, its rapid development and the fatal termination, all point unmistakably to a malignant tumor. It is to be regretted, however, that a microscopic examination was not made.

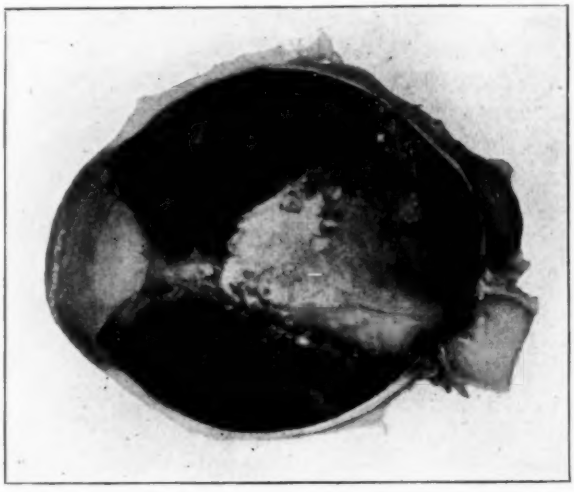

FIG. 1.—Case II, baby C. Right eye. Macroscopic appearance, showing retinal and epibulbar tumors.

CASE II—*Bilateral Glioma of the Retina.*—Baby C., male, two years old, first examined December 10, 1906. The child was brought to me on account of severe pain in the right eye, from which he had suffered for several weeks past. He was in good physical condition—well nourished, and had always enjoyed good health. When the boy was one year old the father noticed that the right eye looked cloudy, and thinks he has not seen with it for several months.

Right eye : Pupil dilated at maximum ; T+. The globe was filled with a growth which apparently extended to the lens. The latter was pushed forward almost obliterating the anterior cham-

ber. Characteristic pinkish reflex from the fundus. The tumor appeared quite vascular.

Left eye: Pupil moderately dilated; T. normal; tumor visible, but not nearly as large as the one in the right eye nor so vascular. It presented an irregular lobulated surface toward the outer side. No pain in the eye.

Patient was taken home, but returned for operation January 1, 1907. Enucleation of both eyes. The left one presented no abnormalities. The right one was enlarged in all its diameters. On the temporal side of the globe, close to the optic nerve, there was found an epibulbar tumor, ten mm. in height, six mm. in

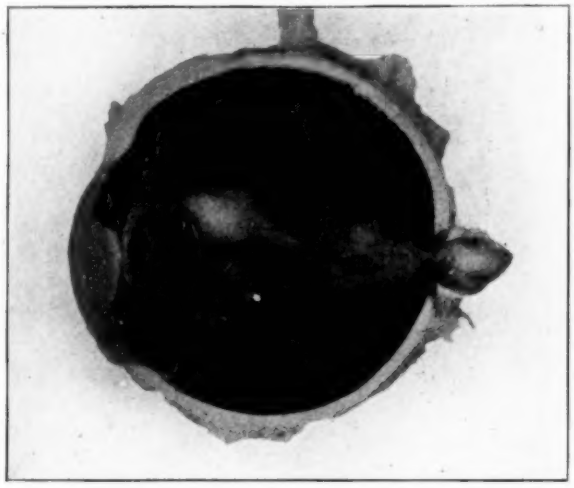

FIG. 2—Case II, baby C. Left eye. Macroscopic appearance.

breadth. Its surface was smooth and reddish in color. The optic nerve was much enlarged, being six mm. in diameter at the thickest portion, but the cardiac end, close to the optic foramen, was apparently normal.

PATHOLOGIC DESCRIPTION AND MICROSCOPIC EXAMINATION BY DR. K. L. STOLL.

Right eye: Enlarged, cornea clear, pupil dilated ad maximum, yellow reflex with a red tinge shining through the clear lens. Optic nerve considerably swollen at its entrance into the eyeball, six mm. in diameter and growing thinner at a distance of seven to eight mm. from the globe, causing the optic nerve to assume

a pear-shaped form. Near the optic nerve, in the posterior pole of the globe, there is a soft tumor, eight mm. in diameter and of the color and shape of the half of a yellow pea. The globe is hard and heavy. After having been fixed in a 4 per cent. solution of formaldehyde it was dissected in its horizontal meridian, cutting through the epibulbar tumor and the center of the optic nerve. As soon as the sclera was cut into a yellow red liquid oozed out, apparently purulent exudate mixed with some blood.

FIG. 3.—Case II, baby C. Right eye, showing epibulbar, choroidal and retinal tumors. Enlargement of optic nerve and glaucoma.

The cross section shows the following condition: Cornea normal, sclera as thin as would be expected in an infant, anterior chamber of less than normal depth, iris contracted and pressed against the periphery of the cornea, obliterating the angle. Lens slightly protruding into the anterior chamber. The retina is completely detached and transformed into a tumor, which stretches from the papilla forward to the posterior capsule of the lens, where the everted membrane is adherent. The fore-

most portion of the retina is clear and closely adapted to the walls from the ora serrata on. The tumor itself is soft, shows distinct radiation springing from the disc and has an irregular nodular surface. The color varies between a glassy white and a faint pink. The choroid and pigment layer bear in general their normal appearance, although numerous atrophic patches and some deposits of exudation are dispersed upon these membranes. A rather rare picture is offered by a portion of the tumor arising from the papilla and extending between the choroid and sclera. Its color is distinctly different from the retinal portion of the growth, namely, of a slightly red hue, and more glassy than that. It extends to a distance of sixteen mm. from the center of the papilla. The epibulbar tumor is situated outside the sclera where the subchoroidal portion reaches its greatest thickness. The continuation of the sclera is not separated in the cross section. It seems to be thinner, however, on this spot, as if it were eroded by the tumor. The optic nerve is greatly thickened (to six mm. in cross section), glassy and of a pure white color.

Microscopic examination of the right eye: Cornea, iris and ciliary body not bearing any abnormal features, excepting eversion of the pigment layer of the iris and atrophy of the iris.

The pathological changes will be described in four portions: Those of the tumor proper, the subchoroidal portion, the optic nerve, and the epibulbar tumor. All of them, excepting the epibulbar tumor, show the same loose arrangement of the cells characteristic of the soft species of glioma. In every one of them are areas of degeneration where the staining is less distinct.

1. The tumor proper, involving the detached and transformed retina, contains numerous blood-vessels. Around these glioma cells are arranged in dense circular layers, which resemble closely the rosettes of Wintersteiner. In most of the sections the tumor reaches into the excavated papilla. In this region we are also able to recognize how the two leaves of the detached retina are lifted up and we see two bands of connective tissue as landmarks of the former inside of this membrane. The lamina cribrosa is still intact.

2. It is remarkable that the tumor sends a subdivision below the pigment layer and choroid. We can follow them up to the temporal side of the entrance of the optic nerve, their course being indicated finally by single pigment cells or patches of them and some fibres. In a series of sections (No. 1) we can observe the spot where the tumor has perforated the pigment layer. The

choroid itself has entirely disappeared all along this tumor, but few traces having been spared. We see, furthermore, some formations of the choroid which resemble cysts. Here the pigmentation is very abundantly gathered around a homogenous substance.

3. The optic nerve is thickened and has undergone a complete transformation into glioma tissue.

4. The epibulbar tumor. Its cells are arranged more densely than in any one of the other portions. These cells stain more

FIG. 4.—Case II. 1, Head of optic nerve; 2, optic nerve; 3, sclera; 4, choroidal tumor; 5, pigment of pigment layer; 6, retinal tumor.

intensely than those of the other portions, indicating the more recent origin. Here the sclera is considerably thinner, at some instances only half of its thickness, it is crossed by numerous bloodvessels and nerves. Tracks of cells protrude between the fibres of the sclera. Some small colonies of glioma cells appear close to the inner border of the sclera, at a spot where the sclera is about half as thick as beyond the area of the epibulbar tumor. The chief place where the glioma broke its way through the sclera is not located in the hemisphere used for microscopical purpose. It is situated in the portion used as a macroscopical specimen.

Left eye: Smaller in size than the right and not so heavy. No epibulbar tumor, optic nerve not affected. Cornea clear, anterior chamber of normal depth, pupil moderately dilated, showing a

bright and slightly yellowish reflection through the clear lens. The globe was dissected in the horizontal meridian, a light amber-colored fluid escaping. The lens is *in situ*. Funnel-shaped detachment of the retina, enclosing a tumor of the size of a pea, and appearing thickened in its entire extent. Near the disc there are two cystoid enlargements in the retina. The front portion of the detached retina is lying against the ciliary body and the lens, to which parts it is partly adherent. There are numerous fine and several larger atrophic spots in the pigmentosa but no deposits of exudation upon it. The optic nerve appears normal on the cross section, showing distinctly the line of demarcation in the lamina cribrosa.

Microscopic examination of the left eye: Cornea and sclera are normal. Lens: Capsule normal, at the periphery vacuoles and globules, zonula Zinnii well preserved. Iris and ciliary body atrophic, angle of anterior chamber obliterated. Some detached pigment cells suspended in the posterior chamber and behind the ciliary body, some clusters of glioma cells upon the anterior surface of the iris and in the anterior chamber. Pigment layer of the iris everted at the pupillary margin. Choroid reduced in thickness, in some regions atrophic. The pigmentation is throughout adherent to the choroid. We see heaps of pigment cells near and upon the ora serrata. The one (right) edge of the pigmentosa is reversed at the entrance of the nerve. At another spot (about two-thirds of the distance between the optic nerve and the ora serrata on the right side) we find a heap of glioma cells between pigmentosa and choroid.

The retina is completely detached up to the ora serrata and throughout degenerated, while the cells between the ora serrata and ciliary body appear normal. Glioma cells can be seen all over the area of the retina. They are dispersed or loosely arranged or form larger patches and colonies. Wintersteiner "rosettes" were not found in any specimen of this eye, although there are numerous colonies arranged in circles around blood-vessels. Of special interest are cyst-like formations, bordered by flat cells and fibres of the connective tissue type. Pigmented cells are dispersed over the tumor, single and in small groups.

Nervus opticus: The papilla is excavated and filled with glioma cells. No glioma cells, however, are found outside of the lamina cribrosa, the trunk of the optic nerve being absolutely free from glioma cells.

DOUBLE GLIOMA OF RETINA.

Case Report.—Pathological Examination.*

By K. L. Stoll, M.D.,
CINCINNATI, OHIO.

The history and interesting specimen of this case I received from Dr. J. A. Stucky, of Lexington, Ky., to whom I am greatly indebted for the kind permission to report it.

Jake C., male, white, two and one-half years of age, was seen first by Dr. Stuckey on May 22, 1909. The parents stated that in January, 1909, they noticed that the right pupil was dilated and the vision of this eye soon was lost; no redness, no pain nor other symptoms. At this time the child was seen by Dr. N., of Lexington, who advised waiting for further developments. Two weeks ago the eyeball became markedly enlarged and bulging, which condition has steadily increased until the present time. At no time has there been pain complained of. Yesterday, parents noticed that the boy was unable to see near objects with the left eye, although he was able to recognize persons across the street. At the time of examination the child was listless and apparently dazed.

Examination.—Right eye, marked exophthalmos, sclera of a decided bluish tint, especially at the inner edge of the cornea; pupil much dilated and unresponsive; tension markedly increased. Ophthalmoscopic examination showed the whole fundus covered by a white glistening mass, which seemed to occupy principally the posterior portion of the globe as a large tumor, and a provisional diagnosis of glioma was made. Left eye: Apparently normal, pupil responding readily; tension not increased and apparently no enlargement of the globe; ophthalmoscopic examination showed a glistening white fundus, but no apparent tumor formation.

Operation and Subsequent History.—On May 22, 1909, the right eye was enucleated, and the nerve section was made well back to the foramen. The nerve was found to be enlarged and constricted at its entrance to the globe. Dr. Stucky sent the specimen to me, freezing sections were made with ethyl chloride and the glioma cells found readily.

The left eye was removed on May 26, 1909, and both orbitæ exenterated simultaneously. On this day the eye was consider-

*Read before the Academy of Medicine of Cincinnati, January 9, 1911.

ably larger than on the day of admission, light perception lost, pupil very much larger and remained dilated. The delivery of the large globe was difficult, the orbital tissue very fragile and of a cheesy consistency. Recovery from the operation was prompt; the healing process of the operative wounds took a normal course.

On September 13, of the same year, the small patient was brought back with recurrence in both orbits. The right orbit was found filled with a hard tumor bulging the lids forward. Lids incised just internal to the skin margin and tumor removed, external canthoplasty being done. Some trouble met with in removing the growth, as it was fixed to the bone all around. Ethmoid broken up and lesser wing of sphenoid loosened in the removal. Bone involved all around the orbit. Left side in better condition, the tumor just beginning. Same procedure of operation. The child died about two months after this operation, in the third year of his life.

Description of the Globes.—Right eye larger than a normal eye, rather heavy and hard. Some shreds of the muscles and connective tissue are adherent, and also some portions of soft tissue, which, upon cutting, bears a slightly tinged, whitish and homogeneous appearance, like that of a neoplasm. The anterior chamber appeared filled with a whitish deposit, similar to a hypopyon, which, however, disappeared as soon as the globe was placed with the cornea upward. In this position the pupil was found fully dilated and the lens apparently dislocated. Upon bisecting the globe, after hardening it in formalin and alcohol of increasing strength, the posterior half of the vitreous chamber was found filled with a neoplasm of the retina extending into the papilla. Retina not detached. The remnants of the vitreous were turbid, coagulated and pressed against the anterior part of the vitreous chamber. A thin fluid oozed out, containing fragments of the neoplasm. The lens capsule was thickened and gray, the nucleus, if we may call it such, of a lemon-colored hue. The cross-section of the optic nerve was greatly thickened and strangulated at its entrance into the globe. A flat tumor, springing from the nerve-entrance, stretched out between sclera and pigment-layer for a distance of about 6 mm. (See Fig. 1.)

Microscopical examination revealed the cornea and sclera free from any changes, the iris rather atrophic and the pigment layer everted at the pupillary margin. A deposit of glioma cells and free iris-pigment in the chamber angle upon the iris and on Descemet's membrane; lens-capsule covered by free glioma cells,

but itself free from any invasion; choroid very atrophic and flat; retina completely transformed into glioma masses, so that it is impossible to distinguish any of its layers. The cells are loosely arranged, forming also so-called tubular strands or windings, which would indicate that the tumor is of rather recent duration. There are, however, numerous badly stained necrotic and fattily degenerated areas dispersed all over the field of the growth, a condition which is thought to be due to insufficient nourishment of a rapidly growing tumor. Other portions again show beginning cell degeneration by their lighter staining and smaller nuclei. This condition is thought by many authors to be the consequence of increased intra-ocular tension. In some of the tubular arrangements we find sections of newly formed blood-vessels which are surrounded by a mantle of cells. These cells are trailing

FIG. 1.—Right eye. 1, optic nerve; 2, choroidal tumor; 3, retinal tumor; 4, sclera; 5, indicating the location from which Fig. 2 is taken.

along the vessels between the above-mentioned patches of dead, necrotic tissue, and challenge a comparison with the vegetation forming an oasis around a well in the desert.

The retinal portion of the growth is covered by a proliferated tissue consisting of layers of cells which stain well with hæmatoxylin. They are heaped up at times, and appear like giant cells. At other spots the cells are spindle-shaped and have a resemblance to the arrangement of the rods and cones. They cannot be identical, of course, with these bodies, for several reasons, especially on account of their location, which would rather suggest that we have to deal with some proliferation of the membrana limitans interna.

The cell forms found in this portion and in the gliomatous optic nerve are of the round cell-type, with very few runs of spindle cells. Giant cells and "rosettes" could not be found in any portion of this globe. Golgi staining was not made for the detection of ganglion or neuroglia cells, because the advanced stage of the tumor is not favorable for their presence.

The most interesting feature is the presence of a portion of the tumor stretching between sclera and pigment layer (see 2 in Fig. 1). It is composed of large and well-stained nuclei interspersed with large round and spindle-shaped pigment cells; is very vascular at its distal termination; towards the optic nerve it is sharply separated in some sections, but gradually shades into the nerve in others. The continuation of the pigment layer is interrupted

FIG. 2.—Choroidal tumor of the right eye, taken from location indicated by "5" in Fig. 1.

at several places, although it can be well followed up, and is seen to terminate at the nerve head in most of the sections. While these conditions would be indicative of a gliomatous degeneration of the choroid, the distal portion shows how the fibers are pushed apart by the proliferating tumor cells. (See Fig. 2.) The lamina cribrosa is strongly cupped, the excavation being filled out by solid tumor masses.

The left eye is smaller than the right, the optic nerve apparently presenting normal conditions; tumor masses adherent to it. The anterior chamber is partly filled with a hypopyon-like deposit. Bisection reveals the entire retina had undergone a pathological change, forming a tumor which stretches as far forward as the ora serrata. The neoplasm filled the greater portion of

the vitreous chamber, leaving but little of the gray and coagulated vitreous. Lens *in situ,* capsule thickened and whitish.

The tissues gained from exenteration of both orbits bore the

FIG. 3.—Left eye. 1, head of optic nerve; 2, sclera; 3, retinal tumor; 4, location from which Fig. 4 is taken.

usual elements of fat and muscles, besides numerous small glands and nodules of glioma.

The microscopical features of the left globe are essentially different from the right in several directions. Cornea and sclera are normal; the iris and ciliary body, however, are swollen and in a state of inflammation, the substantia propria loosened, the pig-

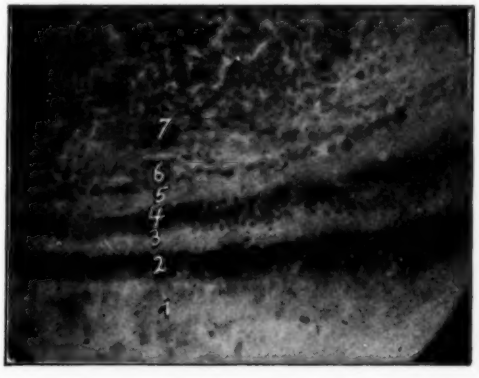

FIG. 4.—Enlargement of location indicated by "4" in Fig. 3. 1, layer of rods and cones; 2, outer nuclear layer; 3, outer plexiform; 4, inner nuclear; 5, inner plexiform; 6, layer of ganglion cells from which the tumor (7) springs.

ment-layer hypertrophic. In the retinal tumor we may recognize at intervals the original layers nearly intact, even the rods and

cones preserved in the vicinity of the optic nerve. (See Fig. 4.) The tubular formation can be studied here very well, longitudinal and cross-sections being represented in equal distribution. Neuro-epithelial rosettes in some lobes of the retinal tumor. This globe furthermore furnishes an excellent illustration of the doctrine that the retinal glioma often springs from several spots simultaneously; in some instances (Figs. 3 and 4) we may even see the gliomatous transformation take place in the layer of the ganglion-cells, whence the process begins to involve the inner plexi-

FIG. 5.—Left eye. 1, head of optic nerve; 2, optic nerve; 3, sclera; 4, edema of retina; 5 and 6, retinal tumor.

form and inner nuclear layer, sending emissaries to the outer nuclear layer. This is the case especially in a nodule right in front of the nerve-head; portions of this nodule are about to push against the lamina cribrosa, which is not cupped but still strong enough to ward off the onslaught of the tumor cells. On both sides of the smaller nodule we see the retina œdematous and especially the layer of the nerve-fibers thickened to many times its normal volume (Fig. 5), going over again into other convolutions, which spring distinctly from the same source, the layer of the ganglion cells. The choroid is atrophied to almost nothing, while the pigment-layer is hypertrophied, especially in some sections farther remote from the disc. The optic nerve is

free from glioma cells, a few sections merely showing accumulation of migrating cells and normal nerve cells.

Considering the extensive changes in this eyeball, we must be surprised that the comparatively scant remnants of normal retina tissue were sufficient to perceive and conduct light up to three or four days previous to total blindness. The whole appearance of this eye, indicative of the exceedingly rapid growth of the neoplasm, allows us to suppose that the process in the other eye was likewise of a very swift type. We cannot help, therefore, but regret gravely that five months' valuable time was lost by the detrimental and incompetent advice to wait. Timely attention when the trouble was first noticed might have saved the other eye and the life of the child. *"Periculum in mora."*

CAUSES AND TREATMENT OF TEMPORARY PARTIAL AMAUROSIS.

A. Pichler (*Wiener Klin. Woch.*, Jan. 12, 1911) says that attacks of recurring scintillating scotoma, from which he suffers himself, are both analogous to migraine and amenable to the same treatment and preventive measures. He has studied fifty-three cases and finds in most of them an hereditary predisposition which is increased by any thing tending to weaken the nervous system or induce vasomotor disturbance. While it is impossible to influence the partial blindness, the succeeding headache may be greatly lessened or even prevented by the use of sedatives. If work be discontinued and the patient lie down upon the first symptoms of the attack it may frequently be cut short. Out of his fifty-three cases, Pichler found pronounced neurasthenia in thirty-nine, and about this same number stated that long, close use of the eyes induced an attack. The actual underlying cause should be sought in each case and removed if possible.

MEDICAL SOCIETIES.

OPHTHALMIC SECTION

ST. LOUIS MEDICAL SOCIETY.

Meeting of March 1st, 1911.

Dr. M. H. Post in the chair.

Dr. John Green, Jr., presented a patient with *Complete Traumatic Aniridia and Lens Injury of the Right Eye.* Recovery with useful vision. He reported as follows:

The patient, a carpenter, aged 25, while engaged in nailing together a wooden trough, about an hour previous to examination, was struck in the eye by a 16 penny nail, which immediately dropped to the ground. Examination revealed an irregularly "T" shaped perforating wound of the cornea, just within the lower limbus. The vertical arm of the "T" occupied about the center of the transverse arm, and extended downward just to the sclero-corneal margin.

The anterior chamber, which was nearly free from blood, contained no iris tissue save a few shreds at the nasal margin.

Ophthalmoscopic examination showed that the lens had been penetrated in the lower third, and that there were a few fine floating shreds in the anterior portion of the vitreous. The fundus details were faintly visible through the upper portion of the lens. The zonule of Zinn was visible throughout the entire lens periphery, except below, where the wound of the cornea made it impossible to get a view of this portion.

Tension was very much diminished, in fact the globe was decidedly soft.

Right eye: Vision=motion of the hand at 1⅛ meters. Left eye: Vision=5/5. Under local anæsthesia the contused edges of the "T" shaped wound were clipped off, the very small quantity of blood that was to be seen in the anterior chamber, evacuated, and an occlusive dressing applied.

The following day there was some chemosis below, the wound looked perfectly clean, the anterior chamber was restored, and vision was the same as the preceding day. From this time on,

the patient made an absolutely uninterrupted, uncomplicated and painless recovery.

Treatment consisted of saline irrigations and occlusive dressing, with protiodid of mercury, ⅛ grain, internally three times a day. About six weeks after the injury the lens was found to be clear centrally, but marked by several peripheral stripes of opacity. The vitreous contained a small number of floating shreds.

Spectacles were prescribed as follows: Right eye, a black disc with a 2 mm. circular opening. Left eye, +1.5 cylinder axis 90°. With this arrangement R. V=5/10+; L. V=5/5+.

Patient wore this arrangement for several weeks and found it a help in the bright light which was dazzling to the aniridic eye. Recently, however, he has found that the right eye has perfectly adjusted itself to its irisless condition, and he is able to work in the brightest sunshine without discomfort.

It is of course, possible, that the lenticular opacity may eventually increase, though there has been no sign of any such process during the past four weeks.

Mayou has recently called attention to the fact that the disappearance of the iris after injury may be rather apparent than real. He has found that in such cases the iris is retracted into the angle of the anterior chamber by the organization of fibrous tissue on its surface. If the iris does not disappear until some time after the injury, it is practically certain that it has been drawn back in the manner described.

Another cause of apparent aniridia is the case of an incarcerated iris which has been swept into a scleral wound by the escaping aqueous humor or the lens. In severe injuries the iris may be bodily carried away by the sudden expulsion of the aqueous humor and lens, or rarely, through the forcible expulsion of the aqueous humor alone (without displacement of the lens).

Recovery with preservation of vision is more likely to occur when a complete avulsion of the iris has taken place.

If fragments of the iris be caught in the wound, a subsequent cyclitis is more likely to occur through inflammation spreading into the globe along the track of the incarcerated iris, or an ingrowth of epithelium may give rise to the formation of a fistula.

A rare cause of apparent aniridia is retroflexion of the iris, i.e., a doubling back of the iris on the ciliary body. This form is always associated with forward dislocation of the lens.

Finally, by reason of the rupture of the pectinate ligament, the ciliary body and iris may be dislocated backward to nearly the equator of the globe, so that the pupillary margin only reaches

forward to the corneo-scleral junction. In this type of injury, therefore, the aniridia is only apparent.

Dr. Green believes that, in the case presented, the roughened point of the 16-penny nail became engaged in the iris tissue which was forcibly avulsed when the nail dropped out of the eye.

Remarks by Dr. Green, after demonstration of the patient in answer to Dr. Saxl:

I am afraid I did not make myself quite clear in regard to penetrating injuries with magnetizable fragments where the wound of entrance is back of the ciliary body. In my experience after the magnet operation the globe can frequently be preserved, but generally without much vision. Dr. Saxl's statement that he removes all contused tissue where that is possible meets with my hearty approval. In iris injuries I am in the habit of doing as broad an iridectomy as I can. Infection sometimes occurs from the lacerated margins of the corneal wound, so I have made it a rule to trim away, i.e., bevel the edges of the wound, with sharp curved scissors. In one or two cases I have drawn up a conjunctival flap to cover the corneal wound and with the best results.

I believe the Section should exert its influence with managers of foundries and other shops where the eyes of the workmen are exposed to hazards, incident to the manipulation of machinery, to secure the installation of safety appliances. A subsidiary of the Steel Corporation in Worcester, Mass., has a "Department of Safety" which investigates all accidents and works out changes to prevent their repetition. For instance, they encase their emery wheel in a steel jacket, which holds the fragments of the emery in case it should burst. A plate glass is interposed between the grinding surface and the workman's eyes to prevent the throwing off of tiny emery fragments. Protective spectacles and a sort of a screen-like arrangement are used by the workmen in performing many of the more hazardous operations of the foundry. Eye injuries from a bursting water glass have been prevented by the adoption of a steel jacket which is placed in front of the glass.

J. G. CALHOUN,
Editor of the Section.

ABSTRACTS FROM MEDICAL LITERATURE.

By J. F. Shoemaker, M.D.,

St. Louis, Mo.

HERPES ZOSTER OPHTHALMICUS.

Elmer E. Wible (*Penn. Med. Jr.*, Jan., 1911) directs attention to certain points of interest concerning herpes zoster ophthalmicus, as follows:

1. Its comparative infrequency among diseases of the eye.
2. Its discovery and description by ophthalmic surgeons less than fifty years ago.
3. Its peculiar and beautiful unilateral distribution.
4. Its ætiology remaining problematical.
5. Its appearance simulating erysipelas, simple herpes febrilis, and points of differentiation.
6. Its serious sequelæ, occurring occasionally, and protracted recovery prompt the oculist to give a guarded prognosis.
7. Its early recognition by the general practitioner or oculist urged in order to insure prompt and proper treatment.

This disease affects usually the frontal branch of the ophthalmic division of the trifacial nerve, an eruption occurring along the course of its distribution. Occasionally the nasal branch is affected through its three divisions, viz.: the ganglionic, ciliary, and infratrochlear. When this branch is affected the eyeball becomes involved, one or more vesicles which later change to ulcers occurring on the cornea; iritis, cyclitis or even panophthalmitis may supervene. The disease occurs most frequently in people past middle life who are of feeble constitution. The most prevalent view concerning its pathology is that it is an inflammatory process involving the nerve trunk itself, the gasserian or ciliary ganglion. It is supposed to be the result of cold, the use of arsenic, and carbonic gas poisoning. It is differentiated from erysipelas by the following points: (1) The former is strictly limited to the distribution of branches of the fifth nerve; (2) it is unilateral; (3) it does not spread as erysipelas; (4) the vesicles are more numerous but smaller: (5) absence of marked elevation of temperature and involvement of neighboring glands; (6) the acute neuralgia pains. From herpes febrilis it is differentiated by: (1) Manifesting a considerably severer course; (2)

irritative symptoms persisting after the rupture of the vesicles; (3) the corneal opacities are more deeply clouded. It lasts from several weeks to several months. The prognosis is generally good but there may be serious loss of vision should the cornea become involved or an iritis develop. Pain may last quite a while after inflammatory symptoms have subsided and the affected eye be left irritable with an anæsthetic cornea and increased tension. The treatment should be local and constitutional. Guaiacol painted over the cutaneous parts involved, followed by dry heat, gives considerable relief to the constant and severe pain. The affections of the cornea, iris and conjunctiva need to be treated as when such affections occur under other circumstances. Internally such tonics as iron, quinin and strychnin are of service. The salicylates may be of much value. For the severe pain often present, opiates may be required.

A SERIES OF STUDIES OF NERVOUS AFFECTIONS IN RELATION TO THE ADJUSTMENTS OF THE EYES.

George T. Stevens (*N. Y. Med. Jr.*, Jan. 7 and 28, 1911) presents his third and fourth studies on this subject. In his third study he discusses imbecility and reports a case greatly benefitted by operations correcting the faulty adjustments of the eyes. He applies the term imbecile to persons having normally developed bodies, and crania of at least average development, but whose mental growth has been stunted because the mind has been unable to co-ordinate or to assimilate the impressions received from the senses. These cases should be differentiated from the idiot and the dement. The case he reports was that of a girl 15 years of age, who was well developed physically and appeared to be in good health. Her mother had not noticed any lack of mental development until the child was three or four years old. In spite of having had private tutors and of having been taken abroad by her parents in attempt to find some way to help her condition, she could not comprehend the relation of facts. Her mental condition was such that Stevens, after more than a month of daily observations and many painstaking attempts to make satisfactory tests of her ocular condition, did not feel sure that he had a single record of a test which, by itself, could be relied upon. By carefully watching the face and by summing up the *probabilities* of all the records he made the following diagnosis: *There is very high grade declina-*

tion of each eye. Objects seen are never still, never twice alike, always in confusion. The things of which she hears and the things which she feels are different from the whirling, unsteady things which she sees. Her senses are thus confused and, as she cannot depend on them, the mind is also confused. If the confusion of senses were relieved the mind would work more true.

He believed the girl to have a positive declination of from 4° to 6° in the right eye and from 6° to 8° or more in the left. Accordingly, with the consent of her parents and of the physician who referred her to him he did an operation for *declination* on the left eye. At this time she weighed ninety-nine pounds. From the time of the operation her mental condition began to improve and satisfactory tests could be made of her ocular condition, the results being quite uniform. Five weeks later an operation was done on the right eye and from that time the improvement in her mental condition was rapid and in three months from the date of the first operation she gained nineteen pounds. Other operations for declinations were done and when the last observations were made, one year from the time of the first operation, there was, *declination,* right 0°, left +2°, and in general appearance the girl was so nearly normal as not to attract the attention of strangers to her defect. She was placed in school, abroad, by her parents and made very favorable progress for months, although she became nervous after a time and was removed from school, after which she soon recovered from the nervousness.

In his fourth study he discusses chronic spasm of the neck and face and reports a case of *torticollis* and one of *tonic and chronic spasm of the facial muscles.* These conditions, in their severe forms are seldom amenable to ordinary remedial measures. The case of torticollis reported had suffered with the permanent spasm of torticollis for seven years in spite of long and vigorous treatment from reputable physicians. Stevens' examination revealed a declination which varied from, right —3°, left +8°, to right —4°, left +12°. Operations for the correction of this ocular anomaly were done and decided relief followed the first operation, while by the time the condition had been reduced to right, 0°, left +3°, the patient had been entirely comfortable for some time and the contracture of the muscles of the neck was greatly reduced, part of what remained doubtless being due to trophic changes which had taken place in the muscles. The case of chronic spasm of the face muscles was that of an active physician who was compelled to give up his large practice because of the

aggravated condition which began with a spasm of the orbicularis muscles so that he could not keep his eyes open. From this condition the spasm extended to all the facial muscles. Any attempt to open the eyes brought on a general spasm of these muscles which later remained in a constant state of spasm. The trouble spread until the muscles of the throat became involved so that it was very difficult for him to swallow. Operations by Stevens to correct the declination of the eyes which existed resulted in a complete cure of all the trouble which had lasted over three years and had resisted all other forms of treatment that had been applied.

Discussing these two cases Stevens says: "Nothing in medical experience could be more clear than that the notable relief in each case not only followed, but was the direct result of the more or less complete correction of the maladjustments of the eyes. It is reasonable then to attribute to the bad adjustments in both cases the extreme conditions of spasm." Concerning the manner in which these faulty conditions produce the trouble, he does not believe that it is by reflex action, but rather that it is brought about by the habitual excessive tension of the affected group of muscles, which muscles have been habitually compelled to act in order to correct the trouble arising from the faulty adjustment of the eyes. Hence, so long as the original cause of the muscle spasm or contracture exists it is not surprising that the affection is absolutely intractable, while if the cause be removed the spasm or contracture disappear unless trophic changes have taken place.

BOOK REVIEWS.

A System of Ophthalmic Operations. Edited and partly written by Casey A. Wood, M.D., C.M., D.C.L. Cleveland Press, Chicago, Ill.

In this comprehensive work of two volumes of over eighteen hundred pages, the entire scope of the operative conduct of ocular diseases is covered, as also of some extra-ocular conditions which cause eye symptoms. The plan of the work is similar to that followed in the *System of Ophthalmic Therapeutics* by the same author, and the two *systems* together very fully cover the field of ocular therapy, both medical and surgical. The chapters on "Some Remedies, Appliances and Procedures Employed in Minor Ophthalmic Surgery," "Some Operations on the Orbital Walls and Contents," "Extraction of the Senile Type of Cataract" and "Operations on the Retina" are written by Dr. Wood, while the others are written by prominent physicians of the United States and Canada. The chapter by Dr. Brawley on "Operations on the Nose and Accessory Sinuses for the Relief of Ocular Symptoms," and the one by Dr. Halstead on "Operations on Distant Organs for the Relief of Eye Symptoms," will be of great value, not only to the few ophthalmic surgeons who choose to do these operations, but also to every ophthalmologist who ought to know the latest methods used in the operations, even though he may not elect to do them. The chapter on "Forensic Relations of Ophthalmic Surgery," by Dr. Shastid, will be of great assistance to those who may wish to inform themselves on such matters.

The works of many ophthalmologists, not only in America, but in other countries as well, have been laid under tribute by the editor and his collaborators to secure material for use in this work, which is illustrated with eighteen colored plates and over one thousand drawings in black and white, many of them being original. A complete index and cross index, together with the fact that, where necessary, certain repetitions are made in order to bring together those descriptions and illustrations needed to make clear the subject, thus avoiding looking up, in another place, part of what one wishes to know, makes this *system* a most

convenient and valuable book of reference. The medical profession is to be congratulated on having accessible a work of this character and every ophthalmic surgeon will do well to possess these two volumes. J. F. SHOEMAKER.

LITORA ALIENA. By Medicus Peregrinus. Boston: W. M. Leonard, 101 Fremont St. 1911. Price 50 cts.

Whoever wants to spend a few hours in most delightful, entertaining and instructive medical reading will be well repaid by perusing these truly charming letters of a traveling physician from the *Boston Medical and Surgical Journal.* Their charm lies not only in their beautiful language, but in the fact that the writer is a cultured gentleman, gifted with poetic feeling and wit, and an eye for the beautiful. These letters should be and, we doubt not, will be widely read.

DIE FUNCTIONSPRUEFUNG DES AUGES FUER STUDIERENDE UND AERZTE. (Testing the functions of the eye for students and practitioners.) By Dr. Anton Elschnig. 2d Edition. 48 illustrations. Leipzig and Wien: Franz Deuticke. 1911.

This second edition of Elschnig's very practical textbook recommends itself to the student and practitioner by being the result of the practical work and studies of a teacher of well-known ability. Textbooks on this subject can at present not give any great amount of original thought, but the personality of the teacher and his own way of imparting his knowledge to the student may very well make one book more impressive than others. We have no doubt Elschnig's book will appeal to a large number of students. ALT.